Polysaccharide-based microgels serve as fat replacers in fermented dairy products

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Fermented dairy products, such as yogurt, are a staple in many diets worldwide and continue to attract consumer interest due to their nutritional value and versatility. In particular, the creamy texture of yogurt is a key attribute driving consumer preference. Growing awareness of healthy eating, including the desire to reduce fat intake, has sustained demand for low-fat products. However, consumer acceptance of these products is not always given, as fat reduction often leads to a loss of creaminess and, consequently, reduced enjoyment.

The addition of hydrocolloids is a common strategy to counteract the negative effects of fat reduction. However, when incorporated as soluble polymers, hydrocolloids often increase viscosity and gel strength, thereby enhancing firmness. In contrast, when polysaccharides are introduced in the form of microgel particles rather than as dissolved polymers, they can reduce viscosity and gel strength while simultaneously influencing the lubricating properties and creaminess perception of fermented protein gels [1,2].

In this study, we demonstrate that pectin-based microgel particles can serve as effective fat replacers in (high-protein) dairy yogurt. Different concentrations of pectin-based microgels were incorporated into milk with varying fat and protein contents prior to fermentation. The resulting yogurts were characterized rheologically and tribologically. The addition of microgels to reduced-fat yogurts yielded lubricating properties comparable to those of full-fat yogurts. Furthermore, the structure-reducing effect of microgels, previously observed in plant-based gels due to their function as inactive fillers, was confirmed for dairy systems. These findings are discussed in direct comparison with results from non-dairy matrices.

The study provides new insights into the interactions between fat, protein, and hydrocolloids in (high-protein) dairy systems and suggests formulation strategies to enhance creaminess and sensory appeal in yogurts while meeting evolving nutritional demands.

Keywords:
emulsions, gels, dairy, microgels, rheology, tribology

References:

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